The Schuylkill River Watershed Initiative

Protecting Our Source

Submitted by

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In conjunction with The Schuylkill Action Network

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Abstract

The historic Schuylkill River is the source of drinking water for over 1.5 million people. In 2003, following an award-winning watershed-wide Source Water Assessment, the Schuylkill Action Network (SAN) was created as a cooperative Federal, State, and Municipal effort to **transition from source water assessment to protection** by addressing high priority water quality issues. Under the leadership of Philadelphia Water Department and the Partnership for the Delaware Estuary, a near-term Restoration Initiative was developed to address stormwater runoff, agricultural practices and abandoned mine drainage, to promote market-based strategies, and to evaluate the efficacy of the SAN as an inter-jurisdictional approach to water quality management. The Restoration Initiative will result in the leveraging of a $1.3 million EPA investment to accomplish $2.25 million in projects, and will help meet the requirements and balance the priorities of the SDWA and CWA, creating a “fishable”, “swimmable”, and “drinkable” Schuylkill River.

Workplan Description: Schuylkill River Restoration Initiative

Introduction

The Schuylkill River is not only a working river; **it is the source of drinking water for over 1.5 million people**. At 130-miles in length with over 180 tributaries, the Schuylkill drains an area of 2,000 square miles of southeastern Pennsylvania and is the largest tributary to the Delaware Estuary. The watershed is diverse, flowing from the Appalachian Mountains, through rich farmland and low rolling hills, into the highly urbanized Atlantic Coastal Plain.

Industrialization and mining in the 19th and 20th centuries left the Schuylkill as one of the most polluted rivers in the nation. In recent years, the river's water quality has improved and migratory fish are returning, but problems remain. Major contributors to these problems include stormwater runoff, agricultural practices, abandoned mine drainage, and sewage overflows.

Between 1999 and 2003, the Philadelphia Water Department (PWD) and the Pennsylvania Department of Environmental Protection (PADEP) expended millions of dollars conducting an award-winning Source Water Assessment (SWA) for 52 surface water intakes in the Schuylkill Watershed. This program resulted in a comprehensive list of contaminant sources and priority restoration sites. In spring 2003, the US Environmental Protection Agency (EPA) Region 3, PADEP, and PWD formed the Schuylkill Action Network (SAN), which is a cooperative effort to **move from assessment to protection of the Schuylkill as a drinking water supply.** The SAN's mission is to restore and protect the watershed as a regional drinking water source, promote stewardship and education, transfer the experience and lessons learned to other communities, and enhance intergovernmental communication and coordination.

The SAN works in partnership with state agencies, local watershed organizations, water suppliers, local governments, and the Federal government to transcend regulatory and

jurisdictional boundaries in the implementation of protection projects. The SAN has established an organizational framework, which includes a steering committee and workgroups, and has identified priority areas for restoration and outreach projects. Five workgroups were established to address stormwater runoff, agricultural practices, abandoned mine drainage (AMD), and sewer discharge, and to coordinate education and outreach activities. The workgroups, which are comprised of representatives from local watershed organizations, municipal government, and non-profit organizations, are working with interested partners to begin implementing priority demonstration projects. Funds requested under this grant will be used to leverage existing efforts by the SAN to implement demonstration projects and to explore several market-based initiatives. This collection of projects represents the first phase of the Schuylkill Restoration Initiative.

The Restoration Initiative will achieve more than a measurable pollution reduction. **It will provide a model for moving from source water assessment to protection** and will demonstrate a cooperative approach to maintaining coordinated actions under the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) for a large watershed. Under the Schuylkill Restoration Initiative, PWD and the Partnership for the Delaware Estuary are requesting $1.3 million to support the SAN and to demonstrate the power of a coordinated, watershed-wide protection initiative that can be used as a model for other watersheds.

Proposed Study Projects

The Restoration Initiative will demonstrate the SAN as an approach to coordinating Federal, state, and municipal participation in the management of a large and diverse watershed to achieve the goals of both the SDWA and the CWA. This demonstration will result in a stronger organizational structure for the SAN and an evaluation report describing the strengths and

weaknesses of this implementation approach, its effectiveness in meeting SDWA and CWA goals, and its general applicability to other watersheds across the nation.

The Restoration Initiative includes over 70 demonstration projects to be implemented in the next three years. These projects are summarized into four themes: stormwater impacts, agricultural impacts, abandoned mine drainage (AMD) impacts, and market based strategies. (Please refer to Appendices B, C, and D for an overview of each project, detailed budget information, and an implementation schedule). Together, these projects represent an interjurisdictional approach to source water protection and water quality management. Their execution will meet the requirements and balance the priorities of both the SDWA and CWA and help to create a "fishable", "swimmable", and "drinkable" Schuylkill River.

Stormwater Impacts

Stormwater is the primary cause of impairment in the Schuylkill Watershed, with a total of 273 stormwater impaired stream miles. The majority of these impairments are located within Montgomery and Philadelphia Counties, the watershed's most populous counties. A restoration analysis performed for the Schuylkill River watershed found that it would cost approximately $288 million to design and reconstruct all stormwater impaired stream miles according to Natural Stream Channel Design principles. Since this is not a feasible restoration strategy, the Stormwater Workgroup will work to ensure that the most recent and proven stormwater controls are used in future development and when retrofitting older areas developed without adequate controls.

The Workgroup will focus its restoration efforts on the largest landowners in order to reach the most people and make the biggest impact. These landowners include 61 school districts, each with several campuses, and golf course owners with lands comprising 11,600 total

acres, located along 43 stream miles. Other targeted landowners include universities and large business campuses. Demonstration stormwater projects will be implemented with the goal of addressing high runoff areas and reaching a broad and diverse portion of the watershed. Piloting new stormwater retrofit BMPs in locations where young and old learn, work, and recreate, provides an opportunity to spread the message about treating stormwater as a resource and not as a problem to a large watershed audience.

An equally important task for the Stormwater Workgroup will be to help municipalities collaboratively address stormwater control issues by targeting municipalities located in Berks, Montgomery, and Chester Counties. The Stormwater Workgroup will assist these municipalities in adopting consistent stormwater ordinances, developing Environmental Advisory Committees, and conducting other activities beyond what is required by current regulations.

A priority stormwater demonstration project is the retrofitting of the Norristown High School and Whitehall Elementary School campus. Combined, the school campus is about 100 acres encompassing one mile of Stony Creek, a highly impaired stream reach. The Stormwater Workgroup will retrofit a portion of 10 acres of parking lots to allow for the infiltration of runoff that currently discharges directly into Stony Creek. This project will restore 3 percent of the Stony Creek watershed's stream miles and will have the added benefit of providing an outside classroom for over 2,000 students at both schools.

Measures for determining the success of the stormwater projects will include the total volume of stormwater infiltrated and the ultimate removal of targeted creeks from the state's 303(d) list. The project partners or local watershed groups will complete water quality monitoring at each project site. The students of Norristown High School and the Stony Creek

Anglers will conduct monitoring for the demonstration project detailed above. Appendix E contains the detailed monitoring plan for all of the stormwater projects.

Agricultural Impacts

Agriculture is the second leading cause of impairment in the Schuylkill Watershed, with 258 agriculturally impaired stream miles. Over 160 impaired miles are located within Berks County, the state's 5th leading county in agricultural production. To address these impaired stream miles the Agricultural Workgroup is pursuing streambank fencing with riparian plantings and the completion of farm conservation plans.

Streambank fencing and riparian plantings were selected based on their effectiveness, low cost, and ease of implementation. The Agricultural Workgroup has already identified farmers in Berks County who are interested in implementing these practices. Nine of those project partners combined have almost 6.5 miles of impaired streams running through their properties. The implementation of fencing and riparian buffers on all of the identified farms in Berks County will restore 11 stream miles and serve as a model for other farmers. Additional streambank fencing and riparian buffers will be targeted toward the top five landowners within Lebanon County, which has the second highest number of agriculturally impaired stream miles in the watershed.

The Workgroup will also support the completion of 50 conservation plans for farms that have already been identified as being interested in developing a plan. Conservation plans will make these farms eligible to receive funding for future implementation projects through the Berks County Conservation District and Natural Resources Conservation Service.

The total number of stream miles fenced, riparian buffers restored, and conservation plans completed will be the first measures of success for these projects. Ultimately, success will

be measured in the removal of streams from the state's 303(d) list. An initial monitoring plan has been developed, (see Appendix E) and additional measures will be finalized by the Agricultural Workgroup.

Abandoned Mine Drainage Impacts

AMD is the third leading cause of impairment in the Schuylkill Watershed and the leading cause of impairment in the headwaters, with a total of 222 AMD impaired stream miles. The AMD Workgroup has identified demonstration projects that will reduce metal concentrations and increase the pH in mine discharges to the headwaters. The four projects of most immediate concern are the Reevesdale South Dip Tunnel discharges, Pine Forest, Oakhill Boreholes, and Silverbrook Mine (see Figure 1 in Appendix A for project locations).

The Reevesdale and Pine Forest demonstration projects include the design, installation, pilot, and evaluation of passive treatment systems consisting of aerobic wetland basins with either flushable oxic (OLD) or anoxic (ALD) limestone drains. These two projects will be of tremendous value in demonstrating the effectiveness of OLD and ALD technology in the treatment of high-volume, low-to-moderate pH, metal-contaminated discharge. Both demonstration projects have received partial funding from non-federal grants and in-kind matching but need additional funds for completion. Implemented together, these projects will treat an average of 6.5 million gallons of discharge each day and remove up to 780 tons of metals over the 20-year life of the projects.

Oak Hill was identified as the highest priority for remediation along the West Branch of Schuylkill, and Silverbrook Mine is one of the largest discharges to the Little Schuylkill River. The AMD Workgroup will complete feasibility studies for each site. The results of these studies will contribute to a Qualitative Hydrologic Unit Plan (QHUP) and will culminate in the

conceptual design of treatment systems for these sites. This will qualify the Upper Schuylkill River for Abandoned Mine Land Reclamation (AMLR) funding for design implementation, which will result in the direct remediation of 7.7 million gallons per day of AMD discharge and the removal of up to 7,300 tons of metals over the 20 year life of the treatment systems.

System performance for the demonstration projects will be measured by the USGS through two years of bimonthly monitoring following implementation, after which the USGS-trained volunteers of the Schuylkill Headwaters Association (SHA) will continue long-term monitoring and maintenance. Appendix E contains the detailed monitoring plan for these projects.

Market-Based Incentive Projects: pollution trading and innovative technology pilots

Market-based incentives for pollution control require components that provide clear economic benefits to multiple parties creating a market for "buyers" and "sellers". The Restoration Initiative will study several components that can be used in a basic pollution-trading program and explore their application within the existing regulatory framework or through other mechanisms such as nutrient trading. The market-based incentives investigated in this study will use innovative technologies that can re-use former waste products for positive environmental benefit, reduce point source pollution, and reclaim and re-use abandoned mine pollution sources.

The feasibility of several market-based initiatives to reduce phosphorus and metals loadings from agricultural lands and to address AMD issues will be investigated. One project will explore the use of water treatment residuals (currently being landfilled) as a phosphorus-retaining soil conditioner for use in agricultural riparian buffers. The technique is promising because it provides a means of disposal for something currently treated as waste, and it offers farmers an opportunity to have an outside party (water suppliers) provide funding and material

for riparian buffer creation. A second pilot study will test the use of a pharmaceutical process to remove phosphorus from the Abington Wastewater Treatment Plant effluent to well below current standards. This process may be a key to developing a point/non-point pollutant trading system for phosphorus, because it can potentially remove significant amounts of phosphorus from point sources, lessening the need for NPS removals that are costly and difficult to implement. A third pilot study will test the use of reclaimed AMD discharge as supplemental water for thermoelectric power generation consumption. The success of this study could result in economically driven incentives for power generation companies in need of evaporative water for cooling to pay for AMD remediation and to develop sustainable remediation programs. An additional AMD study will use sediment removed from reservoirs for abandoned mine reclamation. This will provide the opportunity for beneficial reuse of a difficult to dispose waste product and will effectively reduce AMD. The removal of nutrient-rich sediment from reservoirs in Berks County and the reapplication to nutrient-deficient areas of Schuylkill County could initiate a nutrient-trading program between these two areas of the watershed. Detailed information on market-based incentive projects can be found in Appendix I.

Project Management

Kathy Klein and Chris Crockett will be the project leaders for this initiative. Kathy Klein is executive director of the Partnership for the Delaware Estuary (Partnership), a non-profit organization that has led collaborative and creative efforts to protect and enhance the Delaware Estuary since 1996. The Partnership manages an annual budget of $1.2 million, and was the recipient of the Water Resources Association's Dr. Ruth Patrick Excellence in Education Award in 2001, the USEPA Region 2 Environmental Quality Award in 2002, and the National Oceanic and Atmospheric Administration's 2003 Non-Governmental Organization of the Year.

Chris Crockett is project manager for sourcewater protection activities at the Philadelphia Water Department's Office of Watersheds (OOW), whose mission is to implement a program-integrated approach to protect and restore the water resources in the region. The OOW has led or helped implement over 70 environmental projects and managed over $10 million in local, state and federal environmental grants. The OOW was awarded the 2002 USEPA Region III Source Water Protection Award, the 2003 Exemplary Source Water Protection Award by the American Waterworks Association, and the 2003 USEPA Clean Water Partners Award.

Given their experience conducting similar efforts for the entire Delaware Estuary, Ms. Klein and Partnership staff will be the primary grantees and grant administrators. Mr. Crockett and OOW staff will serve as assistant grant managers and technical advisors to the SAN Steering Committee, which will be responsible for facilitating communication among Workgroups and monitoring project progress and success. Detailed biographies and SAN structure can be found in Appendix G.

Education and Outreach Activities

Education and outreach are critical to the SAN and the Restoration Initiative. The education and outreach goals are to enhance public understanding of the watershed, to educate landowners and municipal officials about stormwater management, and to transfer the knowledge gained from this initiative to watersheds around the country. These goals will be accomplished through programs targeted at a range of audiences, from property owners, to local watershed groups, to national watershed professionals. The Education Workgroup will identify and support new educational initiatives and work with the organizations already engaged in outreach activities to avoid duplication of outreach efforts. Outreach projects and partners are listed in Table 1 of Appendix A.

On a local level, the focus will be to increase the general population's awareness of the Schuylkill River as a recreational, environmental, economic, and drinking water resource. This will be accomplished through highway signs, organized watershed activities, homeowner workshops, school curricula, newsletters, a web-site, and a water quality forecast for recreational activities on the river. Major landowners (schools, farms, golf courses, etc.) will be targeted through certification programs and competitions that will educate them about stream-friendly land management. Additional workshops will target municipal officials, to educate them on environmentally sound land management practices and stormwater ordinances, and to encourage the establishment of Environmental Advisory Councils in priority areas.

The Education Workgroup will facilitate regional and national transfer of the lessons learned, successes and failures through a web-site, publications in professional journals, and participation in state and national conferences. The Workgroup will coordinate a workshop at a national conference on implementing integrated watershed protection plans.

Budget

The Schuylkill Restoration Initiative will match EPA's $1.3 million investment to accomplish, at a minimum, $2.25 million in projects and activities. With additional pending commitments, the Initiative could result in a total budget of $7.75 million. PWD and the Partnership have received direct financial commitments totaling over $955,000 from PADEP, water suppliers, watershed organizations, and other non-federal organizations towards conducting this initiative. A budget summary is provided in Section A of Table 1 below, and Section B provides a more detailed budget breakdown. Appendix C provides detailed lists of budget information, designated or potential subgrantees, and project partners that will be contracted to implement various projects.

Table 1: Schuylkill Restoration Initiative Budget

SECTION A - BUDGET SUMMARY			
Watershed Projects	Federal	Non-Federal	Total
Agricultural Projects	$195,190	$142,500	$337,690
Stormwater Projects	$358,500	$292,500	$651,000
Acid Mine Drainage Projects	$400,000	$68,580	$468,580
Market Based Projects	$110,000	$65,000	$175,000
Outreach Activities	$235,000	$136,920	$371,920
Project Management	$0	$250,000	$250,000
TOTALS	**$1,298,690**	**$955,500**	**$2,254,190**

SECTION B - BUDGET CATEGORIES							
	Watershed Projects						**Total**
Budget Categories	Agricultural Projects	Stormwater Projects	Acid Mine Drainage Projects	Market Based Projects	Outreach	Project Management	
a. Personnel	$33,200	$42,333	$21,480	$12,000	$68,667	$106,200	$283,879
b. Fringe Benefits (in indirect)	$16,600	$21,167	$10,740	$6,000	$34,333	$53,100	$141,940
c. Travel	$0	$0	$0	$0	$8,100	$6,050	$14,150
d. Equipment	$2,500	$6,450	$11,350	$4,000	$3,000	$0	$27,300
e. Supplies	$4,050	$4,051	$2,006	$10,000	$15,900	$5,000	$41,007
f. Contractual*	$256,440	$545,250	$406,895	$134,000	$190,420	$0	$1,533,005
g. Construction	$0	$0	$0	$0	$0	$0	$0
h. Other	$0	$0	$0	$0	$0	$0	$0
i. Total Direct Charges (sum lines a-h)	$312,790	$619,251	$452,470	$166,000	$320,420	$170,350	$2,041,281
j. Indirect Charges (fringe/overhead)	$24,900	$31,750	$16,110	$9,000	$51,500	$79,650	$212,909
TOTALS (sum line i-j)	$337,690	$651,000	$468,580	$175,000	$371,920	$250,000	$2,254,190

*Includes all project related expenses that will be managed by subgrantees including budget categories above